PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Group Art Unit:	Unknown
Attorney Docket No.:	SHC0121
Applicant:	Satoru Tange et al.
Invention:	COMPOSITE SHEET AND PROCESS FOR MAKING THE SAME
Serial No:	Unknown
Filed:	Herewith
Examiner:	Unknown

Certificate Under 37 C F R 1 10

"EXPRESS MAIL" MAILING LABEL NUMBER EL731374993US

DATE OF DEPOSIT MARCH 29, 2001

I HEREBY CERTIFY THAT THIS PAPER OR FEE IS BEING DEPOSITED WITH THE UNITED STATES POSTAL SERVICE "EXPRESS MAIL POST OFFICE TO ADDRESSEE" SERVICE UNDER 37 C.F.R 1 10 ON THE DATE INDICATED ABOVE AND IS ADDRESSED TO THE ASSISTANT COMMISSIONER FOR PATENTS WASHINGTON, DC 20231.

on MARCH 29, 2001

Michelle L Neal

PRELIMINARY AMENDMENT

Box Patent Application
Assistant Commissioner for Patents
Washington, DC 20231

Sir:

Prior to the examination of the above-identified application, please amend the application as follows:

IN THE SPECIFICATION

Please replace the second full paragraph on page 2 continuing on the top of page 3 with the following:

- -It is an object of this invention to provide a composite sheet that comprises an elastically stretchable layer and an inelastically stretchable fibrous layer in which the unevenness of the fiber diameter in the inelastically stretchable fibrous layer is minimized and a process for making such a sheet.- -

Please replace the third full paragraph on page 3 with the following:

- -In such a composite sheet, the continuous fibers are oriented substantially in the one direction so that a tensile strength S_1 of the composite sheet in the first direction and a tensile strength S_2 of the composite sheet in the second direction may define a ratio S_1/S_2 of 3.0 or higher.- -

Please replace the first full paragraph on page 4 with the following:

- -In such a process, the continuous fibers lie one upon another substantially without being bonded together to form the inelastically stretchable web and that the web is, in turn, bonded to the elastically stretchable web after the continuous fibers have been oriented substantially in the one direction.- -

Please replace the second full paragraph on page 4 with the following:

- -According to one embodiment of the invention, the process comprises the steps of extruding the continuous fibers from a melt extruder, collecting the continuous fibers on a conveyor running in one direction to form the inelastically stretchable web, orienting the continuous fibers substantially in the one direction and at the same time placing the continuous fibers upon the elastically stretchable web and finally bonding these two webs together intermittently in the one direction to obtain the composite sheet.- -

Please replace the third full paragraph on page 4 continuing to on the top of page 5 with the following:

- -According to another embodiment of the invention, the step of orienting said continuous fibers substantially in said one direction including the use of a first conveyor running

at a velocity V_1 and a second conveyor provided downstream of the first conveyor and running at a velocity V_2 so that a ratio V_2/V_1 may lie in a range of 1.05 ~ 10.- -

Please replace the first full paragraph on page 5 with the following:

- -Fig. 1 is a perspective view of a composite sheet according to one embodiment of the present invention;- -

Please replace the third full paragraph on page 5 with the following:

- -Fig. 3 is a diagram schematically illustrating the process for making a composite sheet according to one embodiment of the present invention.- -

Please replace the fifth full paragraph on page 5 continuing on page 6 with the following:

- -A composite sheet 10 depicted by Fig. 1 in a perspective view comprises an elastically stretchable layer 3 formed by continuous fibers 40 of styrene-based elastomer and an inelastically stretchable layer 2 formed with an inelastically stretchable polypropylene continuous fibers 6 fused with upper surface of the elastically stretchable layer 3 at bonding regions 4A. The composite sheet 10 has X-direction and Y-direction being orthogonal to the X-direction so that the layer 3 is elastically stretchable at least in Y-direction of the X- and Y-directions. The continuous fibers 6 of the inelastically stretchable layer 2 are oriented so as to extend substantially in Y-direction. In the case wherein the elastically stretchable layer 3 has a substantially same tensile strength in X- and Y-directions, a degree of orientation of the continuous fibers 6 can be expressed by a ratio S_1/S_2 where S_1 represents a tensile strength as measured in Y-direction and S_2 represents a tensile strength as measured in X-direction. For the composite sheet 10 according to this invention, the continuous fibers 6 are preferably oriented

with a ratio S_1/S_2 of 3.0 or higher. Except at the bonding regions, the continuous fibers 6 are neither fused nor bonded together but substantially brought into close contact with one another. In other words, the aggregative strength among these fibers 6 are extremely feeble so that the continuous fibers 6 are easily separated from one another as the composite sheet 10 is slightly stretched in Y-direction.- -

Please replace the second full paragraph on page 12 with the following:

- -The composite sheet according to this invention comprises a plurality of inelastically stretchable continuous fibers that are evenly stretched as these continuous fibers are stretched in one direction since they are oriented substantially in the one direction. Consequently, a possible unevenness in the fiber diameter after stretched and therefore in touch as well as in appearance can be minimized.- -

IN THE CLAIMS

Please amend claims 1-6 as follows:

1. (Amended) A composite sheet comprising:

an elastically stretchable layer having upper and lower surfaces; and

an inelastically stretchable fibrous layer formed with [stically] inelastically stretchable continuous fibers,

the elastically stretchable layer and the inelastically stretchable layer [these two layers] being bonded together intermittently in first and second directions orthogonal to each other, [at least, in said first direction, said composite sheet being characterized by that:]

said inelastically stretchable continuous fibers of said inelastically stretchable fibrous layer being [are] oriented substantially in said one direction so that a tensile strength S_1 of said composite sheet in said first direction and a tensile strength S_2 of said composite sheet in said

second direction [may] define a ratio S_1/S_2 of 3.0 or higher.

2. (Amended) The composite sheet according to Claim 1, wherein said composite sheet has a stretch efficiency in said first direction that is in a range of about 60 [~] to 90 %.

3. (Amended) A process for making [said] a composite sheet which comprises:

providing [by bonding] an elastically stretchable layer having upper and lower surfaces;

providing [and] an inelastically stretchable fibrous layer formed [by] with inelastically stretchable continuous fibers that lie upon one another without being bonded together;

orienting said inelastically stretchable continuous fibers in a first direction;

positioning said inelastically stretchable fibrous layer [put] on at least one of the upper and lower surfaces of the elastically stretchable layer; and

intermittently bonding said elastically stretchable layer and said inelastically stretchable fibrous layer to each other [intermittently] in said first direction and a second [directions] direction orthogonal to said first direction. [each other, at least, in said first direction, said process being characterized by that:

said continuous fibers lie one upon another substantially without being bonded together to form said inelastically stretchable wed and that the wed is, in turn, bonded to said elastically stretchable web after said continuous fibers have been oriented substantially in said one direction.]

4. (Amended) [The] A process [according to Claim 3,] for making a composite sheet [said process] comprising steps of:

extruding [said] inelastically stretchable continuous fibers from a melt [extruder,] extruder;

collecting said inelastically stretchable continuous fibers on a conveyor running in one direction to form [said] an inelastically stretchable [web,] web;

orienting said inelastically stretchable continuous fibers substantially in said one direction;

providing an elastically stretchable web;

[and at the same time] placing said inelastically stretchable continuous fibers upon said elastically stretchable web; and

[finally] bonding [these two webs] said inelastically stretchable web and said elastically stretchable web together intermittently in said one direction to obtain said composite sheet.

5. (Amended) The process according to Claim 3, wherein said step of orienting said inelastically stretchable continuous fibers substantially in said [one] first direction comprises [including said] conveying said inelastically stretchable continuous fibers on a first conveyor running at a velocity V_1 and on a second conveyor provided [at] downstream of said first [conveyor and] conveyor, said second conveyor running at a velocity V_2 so that a ratio V_2/V_1 [may lie in] is within a range of about 1.05 [~] to 10.

6. (Amended) The process according to Claim 3, wherein said inelastically stretchable continuous fibers are oriented in said [one] first direction so that a tensile strength S_1 of said composite sheet in said [one] first direction and a tensile strength S_2 of said composite sheet in the second direction [orthogonal to said one direction may establish] has a ratio S_1/S_2 of 3.0 or higher.

Please add new claims 7 and 8 as follows:

- -7. The process according to Claim 4, wherein said step of orienting said inelastically stretchable continuous fibers substantially in said one direction comprises conveying said inelastically stretchable continuous fibers on a first conveyor running at a velocity V1 and on a second conveyor provided downstream of said first conveyor, said second conveyor running at a velocity V2 so that a ratio V2/V1 is within a range of about 1.05 to 10.- -

- -8. (Amended) The process according to Claim 4, wherein said inelastically stretchable continuous fibers are oriented in said one direction so that a tensile strength S1 of said composite sheet in said one direction and a tensile strength S2 of said composite sheet in a direction orthogonal to said one direction has a ratio S1/S2 of 3.0 or higher.- -

IN THE ABSTRACT

Please amend the abstract as follows. A clean version of the Abstract is attached hereto as Attachment C.

ABSTRACT

[This invention aims to provide a composite sheet having a layer of inelastically stretchable continuous fibers improved so that a possible unevenness in fiber diameter may be minimized.]

A composite sheet that comprises an elastically stretchable layer and an inelastically stretchable layer formed with inelastically stretchable continuous fibers bonded to at least one surface of the elastically stretchable layer intermittently in one direction. The continuous fibers are oriented substantially in one direction thereof so that the composite sheet may present a ratio S_1/S_2 of 3.0 or higher where S_1 represents a tensile strength in this one direction and S_2 represents a tensile strength in the direction orthogonal to this one direction.

• • • REMARKS • • •

By the present Preliminary Amendment, the specification, claims and abstract have been revised to more clearly describe applicant's invention in accordance with the requirements of 35 U.S.C. § 112.

Care has been taken so as to avoid the addition of new matter in the claims and abstract.

Entry of the present Preliminary Amendment prior to the examination of the application is respectfully requested.

In the event applicant has overlooked the need for an extension of time, an additional extension of time, payment of fee, or additional payment of fee, applicant hereby petitions therefor and authorizes that any charges be made to Deposit Account No. 02-0385, Baker & Daniels.

Respectfully submitted,

Anthony Niewyk
Reg. No. 24,871

BAKER & DANIELS
111 East Wayne Street
Suite 800
Fort Wayne, Indiana 46802
(219) 460-1661

MSG/mln/173785

ATTACHMENT A

Changes Made to Specification Paragraphs

The second full paragraph on page 2 continuing on the top of page 3:

It is an object of this invention to provide a composite sheet [similar to those of prior art so far as the sheet] that comprises an elastically stretchable layer and an inelastically stretchable fibrous layer [but improved so that] in which the unevenness of the fiber diameter in the inelastically stretchable fibrous layer [may be] is minimized and a process for making such a sheet.

The third full paragraph on page 3:

In such a composite sheet, [this invention is characterized by that] the continuous fibers are oriented substantially in the one direction so that a tensile strength S_1 of the composite sheet in the first direction and a tensile strength S_2 of the composite sheet in the second direction may define a ratio S_1/S_2 of 3.0 or higher.

The first full paragraph on page 4:

In such a process, [this invention is characterized by that] the continuous fibers lie one upon another substantially without being bonded together to form the inelastically stretchable web and that the web is, in turn, bonded to the elastically stretchable web after the continuous fibers have been oriented substantially in the one direction.

The second full paragraph on page 4:

According to one [preferred] embodiment of the [process according to this] invention, the process [comprising] comprises the steps of extruding the continuous fibers from a melt

extruder, collecting the continuous fibers on a conveyor running in one direction to form the inelastically stretchable web, orienting the continuous fibers substantially in the one direction and at the same time placing the continuous fibers upon the elastically stretchable web and finally bonding these two webs together intermittently in the one direction to obtain the composite sheet.

The third full paragraph on page 4 continuing to on the top of page 5:

According to another [preferred] embodiment of the [process according to this] invention, the step of orienting said continuous fibers substantially in said one direction including the use of a first conveyor running at a velocity V_1 and a second conveyor provided [at] downstream of the first conveyor and running at a velocity V_2 so that a ratio V_2/V_1 may lie in a range of 1.05 ~ 10.

The first full paragraph on page 5:

Fig. 1 is a perspective view of [the] a composite sheet according to one embodiment of the present invention;

The third full paragraph on page 5:

Fig. 3 is a diagram schematically illustrating the process for making [the] a composite sheet according to one embodiment of the present invention.

The fifth full paragraph on page 5 continuing on page 6:

A composite sheet 10 depicted by Fig. 1 in a perspective view comprises an elastically stretchable layer 3 formed by continuous fibers 40 of styrene-based elastomer and an inelastically stretchable layer 2 formed with an inelastically stretchable polypropylene continuous fibers 6 fused with upper surface of the elastically stretchable layer 3 at bonding regions 4A. The

composite sheet 10 has X-direction and Y-direction being orthogonal to the X-direction so that the layer 3 is elastically stretchable at least in Y-direction of the X- and Y-directions. The continuous fibers 6 of the inelastically stretchable layer 2 are oriented so as to extend substantially in Y-direction. In the case wherein the elastically stretchable layer 3 has a substantially same tensile strength in X- and Y-directions, a degree of orientation of the continuous fibers 6 can be expressed by a ratio S_1/S_2 where S_1 represents a tensile strength as measured in Y-direction and S_2 represents a tensile strength as measured in X-direction. For the composite sheet 10 according to this invention, the continuous fibers 6 are preferably oriented with [the] a ratio S_1/S_2 of 3.0 or higher. Except at the bonding regions, the continuous fibers 6 are neither fused nor bonded together but substantially brought into close contact with one another. In other words, the aggregative strength among these fibers 6 are extremely feeble so that the continuous fibers 6 are easily separated from one another as the composite sheet 10 is slightly stretched in Y-direction.

The second full paragraph on page 12:

The composite sheet according to this invention [is characterized in that] comprises a plurality of inelastically stretchable continuous fibers that are evenly stretched as these continuous fibers are stretched in one direction since they are oriented substantially in the one direction. Consequently, a possible unevenness in the fiber diameter after stretched and therefore in touch as well as in appearance can be minimized.

ATTACHMENT B

Clean Copy of Claims

1. A composite sheet comprising:

an elastically stretchable layer having upper and lower surfaces; and

an inelastically stretchable fibrous layer formed with inelastically stretchable continuous fibers,

the elastically stretchable layer and the inelastically stretchable layer being bonded together intermittently in first and second directions orthogonal to each other,

said inelastically stretchable continuous fibers of said inelastically stretchable fibrous layer being oriented substantially in said one direction so that a tensile strength S_1 of said composite sheet in said first direction and a tensile strength S_2 of said composite sheet in said second direction define a ratio S_1/S_2 of 3.0 or higher.

2. The composite sheet according to Claim 1, wherein said composite sheet has a stretch efficiency in said first direction that is in a range of about 60 to 90 %.

3. A process for making a composite sheet which comprises:

providing an elastically stretchable layer having upper and lower surfaces;

providing an inelastically stretchable fibrous layer formed with inelastically stretchable continuous fibers that lie upon one another without being bonded together;

orienting said inelastically stretchable continuous fibers in a first direction;

positioning said inelastically stretchable fibrous layer on at least one of the upper and lower surfaces of the elastically stretchable layer; and

intermittently bonding said elastically stretchable layer and said inelastically stretchable fibrous layer to each other in said first direction and a second direction orthogonal to said first

direction.

4. A process for making a composite sheet comprising steps of:

extruding inelastically stretchable continuous fibers from a melt extruder;

collecting said inelastically stretchable continuous fibers on a conveyor running in one direction to form an inelastically stretchable web;

orienting said inelastically stretchable continuous fibers substantially in said one direction;

providing an elastically stretchable web;

placing said inelastically stretchable continuous fibers upon said elastically stretchable web; and

bonding said inelastically stretchable web and said elastically stretchable web together intermittently in said one direction to obtain said composite sheet.

5. The process according to Claim 3, wherein said step of orienting said inelastically stretchable continuous fibers substantially in said first direction comprises conveying said inelastically stretchable continuous fibers on a first conveyor running at a velocity V_1 and on a second conveyor provided downstream of said first conveyor, said second conveyor running at a velocity V_2 so that a ratio V_2/V_1 is within a range of about 1.05 to 10.

6. The process according to Claim 3, wherein said inelastically stretchable continuous fibers are oriented in said first direction so that a tensile strength S_1 of said composite sheet n said first direction and a tensile strength S_2 of said composite sheet in the second direction has a ratio S_1/S_2 of 3.0 or higher.

7. The process according to Claim 4, wherein said step of orienting said inelastically stretchable continuous fibers substantially in said one direction comprises conveying said inelastically stretchable continuous fibers on a first conveyor running at a velocity V_1 and on a second conveyor provided downstream of said first conveyor, said second conveyor running at a velocity V_2 so that a ratio V_2/V_1 is within a range of about 1.05 to 10.

8. The process according to Claim 4, wherein said inelastically stretchable continuous fibers are oriented in said one direction so that a tensile strength S_1 of said composite sheet in said one direction and a tensile strength S_2 of said composite sheet in a direction orthogonal to said one direction has a ratio S_1/S_2 of 3.0 or higher.

ATTACHMENT C

Clean copy of Abstract

ABSTRACT

A composite sheet that comprises an elastically stretchable layer and an inelastically stretchable layer formed with inelastically stretchable continuous fibers bonded to at least one surface of the elastically stretchable layer intermittently in one direction. The continuous fibers are oriented substantially in one direction thereof so that the composite sheet may present a ratio S_1/S_2 of 3.0 or higher where S_1 represents a tensile strength in this one direction and S_2 represents a tensile strength in the direction orthogonal to this one direction.